

AMENDMENTS TO THE CLAIMS

Claims 1-8 (canceled)

Claim 9. (currently amended): An imaging system, comprising:

an active pixel image sensor array disposed on a substrate, said array comprising a plurality of pixels;

at least one analog to digital converter for sampling and converting analog information from pixels in said array to digital values; and

a plurality of digital memory arrays disposed on said substrate for storing and accumulating said digital values;

wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in one of said digital memory arrays, said stored values being accumulated and representing a digital integrated value for said integration period of said pixel.

Claim 10. (previously presented): The imaging system of claim 9, wherein said active pixel image sensor array is a CMOS image sensor.

Claim 11. (previously presented): The imaging system of claim 9, wherein said at least one analog to digital converter is an oversampling converter.

Claim 12. (previously presented): The imaging system of claim 9, further comprising an analog signal processor including column analog double sampling circuitry.

Claim 13. (previously presented): The imaging system of claim 12, wherein said column analog double sampling circuitry samples both a signal and a reference for decreasing pixel fixed pattern noise.

Claim 14. (previously presented): The imaging system of claim 12, wherein said analog signal processor further comprises at least one preamplifier with adjustable gain.

Claim 15. (previously presented): The imaging system of claim 9, wherein said at least one analog to digital converter comprises a column analog to digital converter for each pixel column of said active pixel image sensor array.

Claim 16. (previously presented): The imaging system of claim 9, further comprising at least one digital signal processor coupled between said at least one analog to digital converter and said one of said plurality of digital memory arrays.

Claim 17. (currently amended): The imaging system of claim 16, wherein ~~stored multiple sampled digital values for each pixel stored in said one of said plurality of digital memory arrays are used to provide an integrated output signal for said each pixel~~ said represented integrated value is output from said digital memory array.

Claim 18. (Currently amended): A method of acquiring an image, comprising:

using an active pixel image sensor array including a plurality of pixels to image a scene and to produce analog image information, said active pixel image sensor array being disposed on a semiconductor substrate;

sampling and converting said analog image information for a first pixel of said active pixel image sensor array a plurality of times during a desired integration period to produce a first plurality of digital values;

storing said first plurality of digital values in a first digital memory, said first digital memory being disposed on said semiconductor substrate;

accumulating said first plurality of digital values in said first digital memory, said accumulated first plurality of digital values representing a first digital integrated signal for said integration period of said first pixel;

sampling and converting said analog image information for a second pixel of said active pixel image sensor array a plurality of times during a desired integration period to produce a second plurality of digital values; ~~and~~

storing said second plurality of digital values in a second digital memory, said second digital memory being disposed on said semiconductor substrate; and

accumulating said second plurality of digital values in said second digital memory, said accumulated second plurality of digital values representing a second digital integrated signal for said desired integration period of said second pixel.

Claim 19. (previously presented): The method of claim 18, wherein said active pixel image sensor array is a CMOS image sensor.

Claim 20. (previously presented): The method of claim 18, further comprising using the stored digital values for each pixel to produce a respective integrated pixel output signal for said integration period.

Claim 21. (Currently amended): A semiconductor chip, comprising:

a substrate comprising:

an active pixel image sensor array comprising a plurality of pixels;

at least one analog to digital converter for sampling and converting analog information from pixels in said array to digital values; and

a plurality of digital memory arrays for storing and accumulating said digital values;

wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored and accumulated in one of said digital memory arrays, said accumulated values representing a respective integrated signal for each pixel during said integration period.

Claim 22. (previously presented): An imaging system as defined in claim 9 wherein said plurality of digital memory arrays comprises two digital memory arrays.

Claim 23. (previously presented): An imaging system as defined in claim 22 wherein said two digital memory arrays are disposed on opposite sides of said active pixel image sensor array.

Claim 24. (Canceled)

Claim 25. (previously presented): A method of acquiring an image as defined in claim 18 wherein said first and second digital memories are disposed on opposite sides of said active pixel image sensor array.

Claim 26. (previously presented): A semiconductor chip as defined in claim 21 wherein said substrate further comprises:

an analog signal processor coupled to at least one pixel of said plurality of pixels of said active pixel image sensor array; and

a digital signal processor coupled to said analog signal processor and coupled to at least one array of said plurality of digital memory arrays.

Claim 27. (New) The imaging system of claim 23, wherein said first digital memory array is connected through a first analog to digital converter to receive a first set of signals from said pixel image sensor array and said second digital memory array is connected through a second analog to digital converter to receive a second set of signals from said pixel image sensor array.

Claim 28. (New) A method of acquiring an image as defined in claim 25, wherein said first digital memory array receives a first set of signals from said pixel image sensor array through a first analog to digital converter and said second digital memory array receives a second set of signals from said pixel image sensor array through a second analog to digital converter.